

providing a first patterned photoresist on said dielectric layer to expose a portion of said dielectric layer at which at least a portion of a trench is to be formed;

implanting ions into said exposed dielectric layer in a depth of part of the thickness under the masking of said first patterned photoresist so as to form a dense region having an etching rate lower than that of said dielectric layer;

removing said first patterned photoresist;

providing a second patterned photoresist on said dielectric layer, said second patterned photoresist defining an etching opening for exposing at least part of said dense region and a region of said dielectric layer in which a via hole is to be formed;

etching said exposed dielectric layer and said dense region simultaneously under the masking of said second patterned photoresist until a portion of said substrate is exposed; and

removing said second patterned photoresist.

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52. The method according to claim 51, wherein the process of implanting comprises a retrograde implantation.

53. The method according to claim 52, wherein said retrograde implantation comprises:

a first ion implantation process with a first energy substantially between 20 to 100 KeV to form a first ion implantation region in said dielectric layer; and

a second ion implantation process with a second energy substantially between 350 to 700 KeV.

54. The method according to claim 52, wherein said retrograde implantation comprises:

a first ion implantation process with a first energy substantially between 20 to 100 KeV to form a first ion implantation region in said dielectric layer;

a second ion implantation process with a second energy substantially between 350 to 700 KeV to form a second ion implantation

region in said first ion implantation region of said dielectric layer; and
a third ion implantation process with a third energy substantially
between 1 to 3 MeV.

55. The method according to claim 54, wherein said first ion
implantation process comprises a first ion with dosage about 10^{12} to 10^{15} .

56. The method according to claim 55, wherein said first ion
comprises a boron ion.

57. The method according to claim 55, wherein said first ion
comprises a phosphorous ion.

58. The method according to claim 54, wherein said second ion
implantation process comprises a second ion with dosage about 10^{12} to
 10^{15} .

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59. The method according to claim 58, wherein said second ion
comprises a phosphorous ion.

60. The method according to claim 54, wherein said third ion
implantation process comprises a third ion with dosage about 10^{12} to 10^{14} .

61. The method according to claim 60, wherein said third ion
comprises a phosphorous ion.

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62. The method according to claim 51, wherein the etched
selectivity between said dense region and said dielectric layer is about 2.

63. The method according to claim 51, further comprising a
step for forming a hard mask layer on said dielectric layer.